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10/26/2006

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EXAMINER

KAO, CHIH CHENG G

ART UNIT

PAPER NUMBER

2882

DATE MAILED: 10/26/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|---------------------|---------------|--|
| Office Action Summary | Application No. | Applicant(s) | |
| | 10/787,516 | VERMAN ET AL. | |
| | Examiner | Art Unit | |
| | Chih-Cheng Glen Kao | 2882 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 August 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 36-38 and 41-59 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 36-38 and 41-59 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 June 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date. _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on June 19, 2006, has been entered.

Claim Objections

2. Claims 36-38 and 41-59 are objected to because of the following informalities, which appear to be minor draft errors including grammatical and/or lack of antecedent basis problems.

In the following format (location of objection; suggestion for correction), the following correction(s) may obviate the objection(s): (claim 36, line 1; replacing "or" with - -for- -), (claim 36, line 9; replacing "optical element" with - -optic- -), (claim 36, line 12, in the phrase "the background"; deleting "the"), (claim 37, line 2; inserting - -first- - before "aperture"), (claim 38, line 2; inserting - -first- - before "aperture"), (claim 38, line 3; inserting - -first- - before "aperture"), (claim 44, line 1, replacing "optic" with - -optical system- -), (claim 48, line 3; deleting "x-ray reflective"), (claim 51, line 3; deleting "x-ray reflective"), (claim 57, line 2; inserting - -first- - before "aperture"), (claim 58, line 2; inserting - -first- - before "aperture"), and (claim 59, line 2; inserting - -first- - before "aperture").

Claims 37, 38, and 41-59 are objected to by virtue of their dependency. For purposes of examination, the claims have been treated as such. Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 36-38, 42-44, 52, 53, 55, and 57-59 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gutman (US 2002/0064253) in view of Iwasaki (US 2001/0028699).

4. Regarding claim 36, Gutman discloses a system comprising an optic (fig. 1, #10) which conditions an x-ray beam (fig. 1, x-rays), the optic (fig. 1, #10) defining a near end and a far end and including a first optical element defining a first reflective surface (fig. 1, top half of #10) and a second optical element defining a second reflective surface (fig. 1, bottom half of #10) orthogonal to the first reflective surface, the first and second reflective surfaces reflecting x-rays transmitted from an x-ray source (fig. 1, linear accelerator unit) to a sample (fig. 2, #15), and an adjustable first aperture (fig. 1, at #9 or 11) which necessarily adjusts convergence of the x-ray beam by selecting a portion of the x-ray beam delivered by the optic (fig. 1, #10), the first aperture (fig. 1, #11) being positioned between the optic (fig. 1, #10) and the sample (fig. 2, #15).

However, Gutman fails to disclose a second aperture which maximizes flux incident on a sample by occluding a portion of an x-ray beam to reduce background radiation around the sample, the second aperture being positioned between a first aperture and the sample.

Iwasaki teaches a second aperture (fig. 1, #6) which necessarily maximizes flux incident on a sample (fig. 1, S) by occluding a portion of an x-ray beam (fig. 1, at b) to necessarily reduce background radiation (paragraph 41) around the sample (fig. 1, S), the second aperture (fig. 1, #6) being positioned between a first aperture (fig. 1, #4) and the sample (fig. 1, S).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to include the system of Gutman with the second aperture of Iwasaki, since one would have been motivated to make such a modification for better shielding parasitic scattering (paragraph 41) as implied from Iwasaki to reduce distortions.

5. Regarding claim 37, Gutman further discloses wherein the first aperture is a diaphragm (fig. 1, #12).

6. Regarding claim 38, Gutman further discloses wherein the aperture includes a fixed portion (fig. 1, #8) and a movable portion (fig. 1, #9) that is movable relative to the fixed portion, the aperture being adjusted by moving the movable portion (fig. 1, #9) relative to the fixed portion (fig. 1, #8).

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7. Regarding claims 42-44, Gutman further discloses wherein the optic is a two-dimensional optical element (fig. 1, #10), wherein at least one reflective surface has a substantially elliptic shape, and wherein both reflective surfaces have a substantially elliptic shape (paragraph 33).

8. Regarding claim 52, 53, and 55, Gutman further discloses wherein the first optical element is a first multilayer optic and the second optical element is a second multilayer optic, wherein the first multilayer optic and the second multilayer optic have graded d-spacing, and wherein the first multilayer optic and the second multilayer optic have laterally graded d-spacing (paragraph 33).

9. Regarding claims 57 and 59, Gutman further discloses wherein the first aperture (fig. 1, #9) is positioned between the source (fig. 1, linear accelerator unit) and the first and second optical elements (fig. 1, #10), and wherein the first aperture (fig. 1, #9) is attached to the near end of the optic (fig. 1, #10).

10. Regarding claim 58, Gutman further discloses wherein the first aperture (fig. 1, #11) is attached to the far end of the optic (fig. 1, #10).

11. Claims 36-38, 41, and 48-51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gutman et al. (US 6041099) in view of Hasegawa (US 2003/0152192) and Iwasaki.

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12. Regarding claim 36, Gutman et al. discloses a system comprising an optic (fig. 4, #16) which conditions an x-ray beam (fig. 4, from #10), the optic defining a near end and a far end (fig. 4, #16) and including a first optical element defining a first reflective surface (fig. 4, #18a) and a second optical element defining a second reflective surface (fig. 4, #18b) orthogonal to the first reflective surface, the first and second reflective surfaces reflecting x-rays transmitted from an x-ray source (fig. 4, from #10) to a sample (col. 1, lines 9-17), and a first aperture (fig. 5, #58) for convergence of the x-ray beam by selecting a portion of the x-ray beam delivered by the optic (fig. 5, #16), the first aperture (fig. 1, #56) being positioned between the optic (fig. 5, #16) and the sample (col. 1, lines 9-17).

However, Gutman et al. fails to disclose an adjustable aperture, and a second aperture which maximizes flux incident on a sample by occluding a portion of an x-ray beam to reduce background radiation around the sample, the second aperture being positioned between a first aperture and the sample.

Hasegawa teaches an adjustable aperture (fig. 6, #2). Iwasaki teaches a second aperture (fig. 1, #6) which necessarily maximizes flux incident on a sample (fig. 1, S) by occluding a portion of an x-ray beam (fig. 1, at b) to necessarily reduce background radiation (paragraph 41) around the sample (fig. 1, S), the second aperture (fig. 1, #6) being positioned between a first aperture (fig. 1, #4) and the sample (fig. 1, S).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to include the system of Gutman et al. with the adjustable aperture of Hasegawa, since these apertures are art-recognized equivalents at the time the invention was made in that they are all apertures for controlling an x-ray beam, such that the selection of any of

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these known equivalents would have been within the level of ordinary skill in the art. One would have been motivated to make such a modification for more easily adjusting a shape of a beam to the shape of a region of interest (fig. 6) as implied from Hasegawa.

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to include the system of Gutman et al. with the second aperture of Iwasaki, since one would have been motivated to make such a modification for better shielding parasitic scattering (paragraph 41) as implied from Iwasaki to reduce distortions.

13. Regarding claims 37, 38, 41, and 49, Hasegawa further teaches wherein the aperture is a diaphragm (fig. 6), wherein the aperture includes a fixed portion (fig. 6, #3) and a movable portion (fig. 6, #2) that is movable relative to the fixed portion, the aperture being adjusted by moving the movable portion (fig. 6, #2) relative to the fixed portion (fig. 6, #3), wherein the fixed portion is a fixed blade (fig. 6, #3) and the movable portion is a movable blade (fig. 6, #2), and wherein the fixed blade and the movable blade are each substantially L-shaped (fig. 6).

14. Regarding claim 48, Gutman et al. further discloses wherein an aperture (fig. 5, #58) is positioned at or near a distal portion of the optic (fig. 5, #16) relative to the source (figs. 4 and 5, from #10).

15. Regarding claims 50 and 51, Gutman et al. further discloses wherein the aperture (fig. 5, #58) is in a low-convergence position, wherein in the low-convergence position, the aperture necessarily occludes x-rays reflected from a far portion of the optic (figs. 4 and 5). Hasegawa

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further teaches wherein the moveable blade is moveable from a high position to a low position (fig. 6).

16. Claims 41 and 48-51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gutman ('253) and Iwasaki as applied to claim 38 above, and further in view of Hasegawa.

17. Regarding claims 41 and 49, Gutman ('253) as modified above suggests a system as recited above.

However, Gutman ('253) fails to disclose wherein a fixed portion is a fixed blade and a movable portion is a movable blade, and wherein the fixed blade and the movable blade are each substantially L-shaped.

Hasegawa teaches wherein a fixed portion is a fixed blade (fig. 6, blade under #2) and a movable portion is a movable blade (fig. 6, #2), and wherein the fixed blade and the movable blade are each substantially L-shaped (fig. 6).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to include the system of Gutman ('253) as modified above with the blades of Hasegawa, since these apertures are art-recognized equivalents at the time the invention was made in that they are all apertures for controlling an x-ray beam, such that the selection of any of these known equivalents would have been within the level of ordinary skill in the art. One would have been motivated to make such a modification for more easily adjusting a shape without increasing an area (paragraph 6) as shown by Hasegawa.

18. Regarding claim 48, Gutman ('253) further discloses wherein an aperture (fig. 1, #11) is positioned at or near a distal portion of the optic (fig. 1, #10) relative to the source (fig. 1, linear accelerator unit).

19. Regarding claims 50 and 51, Gutman ('253) further discloses wherein the aperture (fig. 1, #11) is in a low-convergence position, wherein in the low-convergence position, the aperture (fig. 1, #11) necessarily occludes x-rays reflected from a far portion of the optic (fig. 1, #10 closer to the linear accelerator unit). Hasegawa et al. further teaches wherein the moveable blade is moveable from a high position to a low position (fig. 6).

20. Claims 45-47, 54, and 56 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gutman ('253) and Iwasaki as applied to claims 43, 53, and 36 above, and further in view of Gutman et al. (US 6014423).

21. Regarding claims 45-47, Gutman ('253) as modified above suggests a system as recited above.

However, Gutman ('253) fails to disclose wherein one reflective surface has a substantially elliptic shape and the other reflective surface has a substantially parabolic shape, wherein at least one reflective surface has a substantially parabolic shape, or wherein both reflective surfaces have a substantially parabolic shape.

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Gutman et al. ('423) teaches wherein one reflective surface has a substantially elliptic shape and the other reflective surface has a substantially parabolic shape (col. 3, lines 34-39), wherein at least one reflective surface has a substantially parabolic shape, or wherein both reflective surfaces have a substantially parabolic shape (col. 2, lines 34-36).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to include the system of Gutman ('253) as modified above with the shapes of Gutman et al. ('423), since these elliptic and parabolic shapes were art-recognized equivalents at the time the invention was made (col. 3, lines 34-39, of Gutman et al. ('423)), such that the selection of any of these known equivalents would have been within the level of ordinary skill in the art. One would have been motivated to make such a modification for a more focused beam (col. 2, lines 37-38) as shown by Gutman et al. ('423).

22. Regarding claim 54, Gutman ('253) as modified above suggests a system as recited above.

However, Gutman ('253) fails to disclose wherein a first multilayer optic and a second multilayer optic have depth graded d-spacing.

Gutman et al. ('423) teaches wherein a first multilayer optic and a second multilayer optic have depth graded d-spacing (col. 3, lines 60-63).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to include the system of Gutman ('253) with the d-spacing of Gutman et al. ('423), since lateral and depth graded d-spacing were art-recognized equivalents at the time the invention was made (col. 3, lines 60-63, of Gutman et al. ('423)), such that the selection of any

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of these known equivalents would have been within the level of ordinary skill in the art. One would have been motivated to make such a modification for better controlling the bandpass (col. 3, lines 60-65) as implied from Gutman et al. ('423).

23. Regarding claim 56, Gutman ('253) as modified above suggests a system as recited above.

However, Gutman ('253) fails to disclose wherein a first optical element is a first x-ray reflective crystal and a second optical element is a second x-ray reflective crystal.

Gutman et al. ('423) teaches wherein a first optical element is a first x-ray reflective crystal and a second optical element is a second x-ray reflective crystal (col. 3, lines 40-45).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to include the system of Gutman ('253) with the crystal of Gutman et al. ('423), since these reflective surfaces and crystals were art-recognized equivalents at the time the invention was made (col. 3, lines 34-39, of Gutman et al. ('423)), such that the selection of any of these known equivalents would have been within the level of ordinary skill in the art. One would be motivated to make such a modification for creating a simpler reflective surface.

Response to Arguments

24. Applicant's arguments with respect to claims 36-38 and 41-59 have been considered but are moot in view of the new ground(s) of rejection.


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Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chih-Cheng Glen Kao whose telephone number is (571) 272-2492. The examiner can normally be reached on M - F (9 am to 5 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ed Glick can be reached on (571) 272-2490. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Chih-Cheng Glen Kao
Examiner
Art Unit 2882